

How Many Planets Will TPF-I Find? - A New Model of Mission Capability

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The Terrestrial Planet Finder Interferometer (TPF-I) is a NASA formation flying interferometer that searches stars for light from orbiting extrasolar planets. Of primary interest are planets in the habitable zone, the region around the stars where liquid water may exist. We present mission modeling that determines the completeness of habitable zone observations over the course of the TPF-I mission. Completeness is defined to be the fraction of potentially observable planets that are detected over a mission. Our algorithm selects the most productive of the TPF candidate stars to observe in each week of the mission. It accounts for multiple visits, solar constraints, variable baselines and planet orbital motion, removing many of the assumptions that were necessary in previous analyses. We describe the multi-level optimization approach and report on preliminary results from the program completeness analysis.